

Reference List for Original HRP Evidence Book 2008 Evidence Report on
Impaired Ability to Maintain Control of Vehicles and Other Complex Systems
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1. André-Deshays C, Israel I, Charade O, *et al.* Gaze control in microgravity. 1. Saccades, pursuit eye-head coordination. *J. Vestib Res* 3:331-344, 1993.
2. Angelaki DE, McHenry MQ, Dickman JD, Newlands SD, Hess BJM. Computation of inertial motion: neural strategies to resolve ambiguous otolith information. *J Neurosci* 19: 316-327, 1999.
3. Antunao MJ, Mohler SR, Gosbee JW. Geographic Disorientation: approaching and landing at the wrong airport. *Aviat Space Environ Med* 60: 996-1004, 1989.
4. Aoki H, Oman CM, Natapoff A, Liu A. The effect of the configuration, frame of reference, and spatial ability on spatial orientation during virtual 3-dimentional navigation training, in *7th Symposium on the Role of the Vestibular Organs in Space Exploration*, European Space Agency: European Space Technology Centre (ESTEC), Noordwijk, the Netherlands, 2006.
5. Aoki H, Oman CM, Natapoff A. Virtual-reality-based 3D navigation training for emergency egress from spacecraft, *Aviat Space Environ Med* 78(8): 774-83.
6. Arrott AP, Young LR. MIT/Canadian vestibular experiment in the Spacelab-1 mission. 6. Vestibular reactions to lateral acceleration following ten days of weightlessness. *Exp Brain Res* 64: 347-352, 1986.
7. Ashkenas IL, Ho RH, Teper GL. Analyses of Shuttle Orbiter Approach and Landing. *J. Guidance, Control and Dynamics* 6(6): 448-455, 1983.
8. Aume NM. An exploratory study of arm-reach dynamics under several levels of gravity, *Ergonomics* 16 1973.481–494, 1973.
9. Baron S, Kleinman DL. The human as an optimal controller and information processor. *IEEE Trans. Man Machine Systems* 10(1):9-17, 1969.
10. Baron S. An Optimal Control Model Analysis of Data from a Simulated Hover Task. *Bolt Beranek and Newman Report ADP001626*, 1983.
11. Benson AJ, Viéville T. European vestibular experiments on the Spacelab-1 mission: 6. Yaw axis vestibulo-ocular reflex. *Exp Brain Res* 64(2): 279-83, 1986.
12. Benson AJ. Spatial disorientation-general aspects. *Aviation Medicine 3rd Ed.* J. Ernsting, AN Nicholson, DJ Rainford, Oxford, England, UK, Butterworth Heinemann, 419-436, 1978.
13. Berger DR, Terzibas C, Bulthoff HH. Influence of motion cueing on helicopter stabilization. Tubinger Wahrnehmungskonferenz TWK. *Inst. For Biolo. Cybernetics*, Tübingen, Germany, 2005.
14. Berger M, Mescheriakov S, Molokanova E, *et al.* Pointing arm movements in short- and long-term spaceflights. *Aviat Space Environ Med* 68: 781-787, 1997.
15. Berthoz A, T. Brandt, *et al.* European vestibular experiments on the Spacelab-1

- mission: 5. Contribution of the otoliths to the vertical vestibulo-ocular reflex. *Exp Brain Res* 64(2): 272-8, 1986.
16. Bertoz A, Melvill Jones G. *Adaptive Mechanism in Gaze Control*. Elsevier Biomedical Press, Amsterdam, 1985.
 17. Bloomberg JJ, Mulavara AP. Changes in walking strategies after spaceflight. *IEEE Eng Med Biol Mag* 22(2): 58-62, 2003.
 18. Bloomberg JJ, Reschke MF, Huebner WP, Peters BT, Smith SL. Locomotor head-trunk coordination strategies following spaceflight, *Journal of Vestibular Research*, 7: 161-177, 1997.
 19. Bock O, Abeele, S, *et al*. Human adaptation to rotated vision: interplay of a continuous and a discrete process. *Exp Brain Res* 152(4): 528-32, 2003.
 20. Bock O, Arnold KE, Cheung BSK. Performance of a Simple Aiming Task in Hypergravity: II. Detailed Response Characteristics. *Aviat Space Environ Med* 67:133-138, 1996b.
 21. Bock O, Arnold KE, Cheung BSK. Performance of a Simple Aiming Task in Hypergravity: I. Overall Accuracy. *Aviat Space Environ Med* 67:127-132, 1996a.
 22. Bock O, Cheung BSK. Control of Isometric Force in Hypergravity. *Aviat Space Environ Med* 69:27-31, 1998.
 23. Bock O, Howard IP, Money KE, *et al*. Accuracy of aimed arm movements in changed gravity. *Aviat Space Environ Med* 63:994-998, 1992.
 24. Bock O. Grasping of Virtual Objects in Changed Gravity. *Aviat Space Environ Med* 67:1185-1189, 1996.
 25. Boeing. Statistical Summary of Commercial Jet Airplane Accidents in Worldwide Operations, 1959-2006. Seattle, WA, *Boeing Commercial Airplanes*: 26, 2007.
 26. Boff K, Lincoln J. Engineering data compendium: human perception and performance. *Wright-Patterson A.F.B.*, Ohio, *Harry G. Armstrong Aerospace Medical Research Laboratory*, 1988.
 27. Borah J, Young L, Curry RE. Optimal estimator model for human spatial orientation. *IEEE Trans. Systems, Man and Cybernetics*, p. 800-805, 1979.
 28. Boyle R, Mensinger AF, Yoshida K, Usui S, Intravaia A, Tricas T, Highstein SM. Neural readaptation to earth's gravity following return from space. *J Neurosci* 86: 2118-2122, 2001.
 29. Braithwaite MG, Durnford SJ, Crowley JS, Rosado NR, Albano JP. Spatial disorientation in US Army Rotary Wing Operations. *Aviat Space Environ Med* 69(11): 1031-1037, 1998.
 30. Burrough B. *Dragonfly: NASA and the Crisis Aboard Mir*. Harper-Collins, New York, 1988.
 31. Campbell MR, Williams DR, Nuckey JC jr, Kirkpatrick AW. Animal surgery during spaceflight on the Neurolab Shuttle mission. *Aviat Space Environ Med*, 76:589 -93, 2005.

32. Cappellari Jr., JO. Where on the Moon? An Apollo Systems Engineering Problem, *The Bell System Technical Journal* 51 (5): 955, 1972.
33. Clarke AH, Grigull J, et al. The three-dimensional vestibulo-ocular reflex during prolonged microgravity." *Exp Brain Res* 134(3): 322-34, 2000.
34. Clarke AH, Teiwes W, Scherer H. Evaluation of the three-dimensional VOR in weightlessness. *J Vest Res* 3: 207-218, 1993.
35. Clément GS. *Fundamentals of Space Medicine*. El Segundo, CA: Microcosm Press, 2003, pp102-105.
36. Clément GS, Moore ST, Raphan T, Cohen B. Perception of tilt (somatogravic illusion) in response to sustained linear acceleration during spaceflight. *Exp Brain Res* 138: 410-418, 2001.
37. Cohen H. *Neuroscience for Rehabilitation.*, 2nd ed. Philadelphia: Lippincott Williams & Wilkins, 1998.
38. Cohen HS, Wells J, Kimball KT, Owsley C. Driving disability and dizziness. *J Safety Res* 34: 361-369, 2003.
39. Cooper HSF, Jr. *A House in Space*. Holt, Rhinehart & Winston, New York, 1976.
40. Currie NJ, Peacock B. International Space Station Robotic Systems Operations - A Human Factors Perspective. *Human Factors and Ergonomics Society Annual Meeting*, Baltimore, MD, HFES, 2001.
41. Curry IP, McGhee JS. Spatial disorientation as a cause of accidents in combat helicopter operations. *ASEM*, 2007.
42. Curry RE, Young LR, Hoffman WC, Kugel DL. A pilot model with visual and motion cues. *Proc. 12th Annual Conference on Manual Control*, 1976.
43. De Vries H. The mechanics of the labyrinth otoliths. *Acta Oto-laryngol* 38: 262-273, 1950.
44. Demer JL, Amjadi F. Dynamic visual acuity of normal subjects during vertical optotype and head motion. *Invest Ophthalmol Vis Sci* 34(6): 1894-1906, 1993.
45. DiZio P, Lackner JR. The effects of gravito-inertial force level and head movements on post-rotational nystagmus and illusory after-rotation. *Exp Brain Res* 70: 485-495, 1988.
46. Durnford SJ, Crowley JS, Rosado NR, Harper J, DeRoche S. Spatial Disorientation: A survey of US army helicopter accidents 1987-1992. *USAARL Report* 95-25, 1995.
47. Endsley M. Toward a theory of situation awareness in dynamic systems, *Human Factors*, vol. 37, no. 1, pp. 32 - 64, 1995.
48. Endsley MR. Toward a theory of situation awareness in dynamic systems. *Human Factors* 37(1): 32-64, 1995.

49. Fernandez C, Goldberg J. Physiology of peripheral neurons innervating the semicircular canals of the squirrel monkey. *I. J. Neurophysiol.* 34: p. 661-675, 1972.
50. Francisco DR, Meck JV. *Small Assessment Team (SAT) Report*. Unpublished NASA HRP internal document, December, 2006.
51. Gazenko OG, Gernin AM, Egorov AD. *Major Medical Results of the Salyut-6-Soyuz 18 5day Spaceflight. (Vol. 2)*, 1981.
52. Gerathewohl SJ, Strughold H, Stallings HD. Sensorimotor performance during weightlessness: eye-hand coordination, *J. Aviat. Med.* 28 1957.7-12.
53. Gillingham KK, Previc FH. Spatial orientation in flight. *Fundamentals of Aerospace Medicine*. RL DeHart. Baltimore, MD, Williams and Wilkins: 309-397, 1996.
54. Gillingham KK, Wolfe JW. Spatial orientation in flight. *Fundamentals of Aerospace Medicine*. RL DeHart. Philadelphia, PA, Lea and Febiger: 299-381, 1986.
55. Gillingham KK, Wolfe JW. Spatial Orientation in Flight: *USAFSAM-TR-31*, 1986.
56. Ginsberg AP, Vanderploeg, J. Vision in space: near vision acuity and contrast sensitivity. *Results of the Life Sciences DSOs Conducted Aboard the Space Shuttle 1981-1986*. M. W. Bungo, T. M. Bagian, M. A. Bowman and B. M. Levitan. Houston, NASA: 179, 1987.
57. Griffin M. *Handbook of Human Vibration*. San Diego, Academic Press Inc., 1990.
58. Grigoriev AIS, Bugrov A, et al. Medical results of the Mir year-long mission *Physiologist* 34(1 Suppl): S44-8, 1991.
59. Grigoryan GA, Gazenko OG, Kozlovskaya IB, Barmin VA, Kreidich YV. The Vestibulo-Cerebellar Regulation of Oculomotor Reactions in Microgravitational Conditions. In: Keller EL, Zee DS (eds) *Adaptive Processes in Visual and Oculomotor Systems*. Pergamon Press, New York, pp. 111-120, 1986.
60. Groen JJ. The semicircular canal system of the organs of equilibrium. *Phys Med Biol London* 1(3): 225-242, 1957.
61. Gurfinkel VS, Lestienne, F, et al. Egocentric references and human spatial orientation in microgravity II. Body-centered coordinates in the task of drawing ellipses with prescribed orientation. *Exp Brain Res* 95: 343-348, 1993.
62. Hanes DA, McCollum G. Cognitive-vestibular interactions: a review of patient difficulties and possible mechanisms. *J Vestib Res* 16: 75-91, 2006.
63. Harm DL, Reschke MF, Parker DE. Visual-Vestibular Integration Motion Perception Reporting, in *Extended Duration Orbiter Medical Project Final Report*, C.F. Sawin, G.R. Taylor, and W.L. Smith, Editors. p. 5.2.1-5.2.12, 1999.
64. Harris L, Dyde R, Oman CM, Jenkin M. Visual cues to the direction of the floor (abstract), in *7th Symposium on the Role of the Vestibular Organs in Space*

Exploration, European Space Agency: European Space Technology Centre (ESTEC), Noordwijk, the Netherlands, 2006.

65. Haslwanter T, Jaeger R, Mayr S, Fetter M. Three-dimensional eye-movement responses to off-vertical axis rotations in humans. *Exp Brain Res* 134: 96-106, 2000.
66. Herdman SJ, Tusa RJ, et al. Computerized dynamic visual acuity test in the assessment of vestibular deficits. *Am J Otol* 19(6): 790-6, 1998.
67. Hillman EJ, Bloomberg JJ, et al. Dynamic visual acuity while walking in normals and labyrinthine-deficient patients. *J Vestib Res* 9(1): 49-57, 1999.
68. Hixson WC, Specia E. Incidence and cost of orientation-error accidents in regular Army aircraft over a five year study period: summary report. *NAMRL-1238/USAARL TR 77-19*, 1977.
69. Holmes SR, Bunting A, Brown DL, Hiatt KL, Braithwaite MG, Harrigan MJ. Survey of spatial disorientation in military pilots and navigators. *Aviation, Space, and Environmental Medicine*, 74(9), 957-965, 2003.
70. Holstein GR, Martinelli GP. The effect of spaceflight on the ultrastructure of the cerebellum. In: Buckey JC, Homick JL. *The Neurolab Spacelab Mission: Neuroscience Research in Space*. NASA SP-2003-535, 2003.
71. Howard IP, Hu G., Visually Induced Reorientation Illusions. *Perception*, 2000.
72. Hu G, Howard, IP, Palmisano S. The role of intrinsic and extrinsic polarity in generating reorientation illusions. *Investigative Ophthalmology and Visual Science*, 40: p. S801, 1999.
73. Jacob RG, Furman JM. Psychiatric consequences of vestibular dysfunction. *Curr Opin Neurol* 14(1): 41-46, 2001.
74. Jacob RG, Furman JM Perel JM. Panic, phobia, and vestibular dysfunction. In: Yates BJ, Miller AD (eds) *Vestibular-Autonomic Regulation* CRC Press, 1996.
75. Jenkin HL, Zacher JE, Jenkin MR, Oman CM, Harris LR. Effect of field of view on the Levitation Illusion. *Journal of Vestibular Research*, 2007. submitted.
76. Jex HR, McDonnell JD, Phatak AV. "Critical" Tracking Task for Man-Machine Research Related to the Operator's Effective Delay Time. *NASA CR-616*, 1966.
77. Johnson RS, Dietlein LF, and Berry CA. *Biomedical Results of Apollo*. Washington, D.C. NASA, 1975.
78. Jones EM. Apollo Lunar Surface Journal, www.history.nasa.gov/alsj/frame.html, 1995.
79. Jones TD. *Sky Walking: An Astronaut's Memoir*. Harper Collins Publishers, New York, 2006.
80. Kanas N, Manzey D. *Space Psychology and Psychiatry*. Microcosm Press, El Segundo CA, 2003.

81. Knierim JJ, McNaughton BL, Poe GR. Three-dimensional spatial selectivity of hippocampal neurons during spaceflight. *Nature Neuroscience* 3(3): 209-210, 2000.
82. Kornilova LN, *et al.* Pathogenesis of sensory disorders in microgravity. *Physiologist*: 34:S36-39, 1991.
83. Kozlovskaya IB, Barmin VA, *et al.* The effects of real and simulated microgravity on vestibulo-oculomotor interaction. *Physiologist* 28(6 Suppl): S51-6, 1985.
84. Kozlovskaya IB, Kirenskaya AV. Mechanisms of disorders of the characteristics of fine movements in long-term hypokinesia. *Neurosci Behav Physiol*. 34(7):747-54, 2004.
85. Krasnov IB. Gravitational neuromorphology. Advances in Space Biology and Medicine, Vol. 4, 85-110, 1994.
86. Kubis J, McLaughlin E, Jackson J, Rusnak D, McBride G, Saxon S. Task and work performance on Skylab missions 2, 3, and 4: Time and motion study - experiment M151. In: *Biomedical Results from Skylab*, vol NASA SP-377, pp 136-154, 1977.
87. Lathan CE, Tracey M. The Effects of Operator Spatial Perception and Sensory Feedback on Human-Robot Teleoperation Performance. *Presence: Teleoperators and virtual environments* 11(4): 368-377, 2002.
88. Lee MH, Durnford SJ, et al. Visual vestibular interaction in the dynamic visual acuity test during voluntary head rotation. *Aviat Space Environ Med* 68(2): 111-7, 1977.
89. Linenger JM. *Off the Planet: Surviving Five Perilous Months Aboard the Space Station Mir*. McGraw-Hill, New York, 2000.
90. Lipshits MI, Gurfinkel EV, Matsakis F, Lestienne F. Microgravity effects on sensorimotor interaction during operational activity: visual feedback. Latent period of motor response, *Aerospace Environ. Med.* 27:22–25, 1993.
91. Liu E. Ed Lu's Journal Entry #2 'Which way is up?' www.edulu.com/whichWay.pdf, 2005.
92. Lyons TJ, Ercoline WR, Freeman JE, Gillingham KK, Classification problems of US Air Force spatial disorientation accidents 1989-91. *Aviation Space and Environmental Medicine* 65: 147-152, 1994.
93. Malcik V. Performance decrement in a flight simulator due to galvanic stimulation of the vestibular organ and its validity for success in flight training. *Aerospace Medicine*, 1968.
94. Manzey D, Lorenz B, Polyakov V. Mental performance in extreme environments: Results from a performance monitoring study during a 438-day spaceflight. *Ergonomics* 41:537-559, 1998.
95. Manzey D, Lorenz B, Schiwe A, *et al.* Dual-task performance in space: results from a single-case study during a short-term space mission. *Human Factors* 37:667-681, 1995.

96. McCluskey R, Clark J, Stepaniak P. Correlation of Space Shuttle landing performance with cardiovascular and neurological dysfunction resulting from spaceflight. *NASA Bioastronautics Roadmap*. Retrieved 26 Jul 2006 from [URL: http://bioastroroadmap.nasa.gov/User/risk.jsp?showData=13](http://bioastroroadmap.nasa.gov/User/risk.jsp?showData=13), 2001.
97. McDonald PV, Bloomberg JJ, Layne CS. Adaptation of musculoskeletal impedance during spaceflight: Implications for postflight head movement control. *Journal of Vestibular Research*, 7: 239-250, 1997.
98. McRuer DT. Human Dynamics and Pilot Induced Oscillations. *Minta Martin Lecture Series*. Cambridge, MA, Massachusetts Institute of Technology, Dept. of Aeronautics and Astronautics, 1992.
99. McRuer DT. The development of pilot-in-the-loop analysis. *Journal of Aircraft* 10(9): 515-524, 1972.
100. Meddick RDL, Griffin MJ. The effect of two-axis vibration on the legibility of reading material. *Ergonomics* 19(1): 21-33, 1976.
101. Menchaca-Brandan MA, Liu AM, Oman CM, Natapoff A. Influence of Perspective-Taking and Mental Rotation Abilities in Space Teleoperation. *2007 ACM/IEEE International Conference on Human-Robot Interaction*. Washington, DC. 2007.
102. Merfeld DM, Polutchnko KA, Schultz K. Perceptual responses to linear acceleration after spaceflight: human neurovestibular studies on SLS-2. *J Appl Physiol* 81(1): 58-68, 1996.
103. Merfeld DM. Effect of spaceflight on ability to sense and control roll tilt: human neurovestibular studies on SLS-2. *J Appl Physiol* 81(1): 50-7, 1996.
104. Merfeld DM. Rotation otolith tilt-translation reinterpretation (ROTTR) hypothesis: A new hypothesis to explain neurovestibular spaceflight adaptation. *Journal of Vestibular Research*, 13: p. 309-320, 2003.
105. Merfeld DM, Young LR, Oman CM, Shelhamer MJ. A multidimensional model of the effect of gravity on the spatial orientation of the monkey. *J Vestib Res* 3(2): p. 141-61, 1993.
106. Merfeld DM, Zupan LH. Neural processing of gravito-inertial cues in humans. III. Modeling tilt and translation responses. *J Neurophysiol* 87(2): p. 819-833, 2002.
107. Mindell DA. *Digital Apollo: Human, Machine and Spaceflight*, Chapter 10, Five More Hands On. (2007, in press)
108. Mittelstaedt H. *Inflight and postflight results on the causation of inversion illusions and space sickness*. In *Scientific Results of the German Spacelab Mission D1*. Norderney, Germany: Wissenschaftliche Projektfuhrung D1/DFVLR, Koln, Germany, 1986.
109. Moore S. PIO using GVS in Airbus simulator. [There are only abstracts; no report or peer reviewed paper as yet, 2005]
110. Moseley MJ, Griffin MJ. Effects of display vibration and whole-body vibration on

- visual performance. *Ergonomics* 29(8): 977-83, 1986.
111. Nicogossian AW, Leach-Huntoon C, Pool SL (eds) Space *Physiology and Medicine. 2nd Edition*. Lea & Febiger, Philadelphia, 1989.
 112. Oman CM, Marcus EN, Curthoys IS. The influence of semicircular canal morphology on endolymph flow dynamics. An anatomically descriptive mathematical model. *Acta Otolaryng* 103(1-2): 1-13, 1987.
 113. Oman CM, Balkwill MD. Horizontal angular VOR, nystagmus dumping, and sensation duration in spacelab SLS-1 crewmembers. *J Vestib Res* 3(3): 315-30, 1993.
 114. Oman CM, Young LR, Watt D, Money KE, Lichtenberg BK, Kenyon RV, Arrott A P. MIT/Canadian Spacelab experiments on vestibular adaptation and space motion sickness. *Basic and Applied Aspects of Vestibular Function*. J. Hwang, N. Daunton and V. Wilson. Hong Kong, Hong Kong University Press: 183-192, 1988.
 115. Oman CM, Kulbaski MJ. Spaceflight affects the 1-g post-rotatory vestibulo-ocular reflex. *Adv Oto-Rhino-Laryng* 42: 5-8, 1988.
 116. Oman CM, Pouliot C F, Natapoff A. Horizontal angular VOR changes in orbital and parabolic flight: human neurovestibular studies on SLS-2. *J Vestib Res* 81(1): 69-81, 1996.
 117. Oman CM, Lichtenberg BK, Money KE, McCoy RK. MIT/Canadian vestibular experiments on the Spacelab-1 mission: 4. Space motion sickness: symptoms, stimuli, and predictability. *Experimental Brain Research*, 64: p. 316-334, 1986.
 118. Oman CM, Benveniste D, Buckland DA, Aoki H, Liu A, Natapoff A. Spacecraft Module Visual Verticals and Training Affect Spatial Task Performance. *Habitation*, 10(3-4): p. 202-203, 2006.
 119. Oman CM, *Human Visual Orientation in Weightlessness*, in *Levels of Perception*, L. Harris and M. Jenkin, Editors. Springer Verlag: New York, NY. p. 375-398, 2003.
 120. Oman CM, Lichtenberg BK, Money KE. *Space motion sickness monitoring experiment: Spacelab 1*. Boca Raton, FL: CRC Press, 1990:217-246.
 121. Oman CM, *Spatial Orientation and Navigation in Microgravity*, in *Spatial Processing in Navigation, Imagery and Perception*, F.W. Mast and L. Janeke, Editors. New York: Springer Verlag., in press, 2007.
 122. Oman CM. The role of static visual orientation cues in the etiology of space motion sickness. In *Symposium on vestibular organs and altered force environment*. Houston, TX: NASA/Space Biomedical Research Institute, 1987.
 123. Paige GD, Seidman SH. Characteristics of the VOR in response to linear acceleration. *Ann NY Acad Sci* 871: 123-35, 1999.
 124. Panait L, Merrell R, Rafiq A, Dudrick S, Broderick T. Virtual reality laparoscopic skill assessment in microgravity. *J Surg Res* 136: 198-203, 2006.

125. Papaxanthis C, Pozzo T, Popov KE, McIntyre J. Hand trajectories of vertical arm movements in one-*G* and zero-*G* environments. *Experimental Brain Research* 120:496-502, 1998.
126. Park S, Gianna-Poulin C, Black FO, Wood SJ, Merfeld DM. Roll rotation cues influence roll tilt perception assayed using a somatosensory technique. 2006
127. Parker DE, Reschke MF, Arrott AP, Homick JL, Lichtenberg BK. Otolith tilt-translation reinterpretation following prolonged weightlessness: implications for preflight training. *Aviation, Space, and Environmental Medicine*, 56: p. 601-606, 1985.
128. Peters BT, Mulavara AP, Brady R, Miller CA, Warren, LE, Richards JT, Cohen HS, Bloomberg JJ. The use of dynamic visual acuity as a functional test of gaze stabilization following spaceflight. The Seventh Symposium on the Role of the Vestibular Organs in Space Exploration, Noordwijk, the Netherlands, June 7-9, 2006.
129. Pompeiano O. Gene expression in the rat brain during spaceflight. In: Buckey JC, Homick JL. *The Neurolab Spacelab Mission: Neuroscience Research in Space*. NASA SP-2003-535, 2003.
130. Previc FH, Ercoline WR, Eds. *Spatial disorientation in aviation. Progress in Aeronautics and Astronautics*. Reston, VA, American Institute of Aeronautics and Astronautics, 2004.
131. Previc FH, Yauch DW, DeVilbiss CA, Ercoline WR, Sipes, WE. In defense of traditional views of spatial disorientation and loss of situation awareness. *Aviation Space and Environmental Medicine* 66(11): 1103-1106, 1995.
132. Rafiq A, Hummel R, Lavrentyev V, Derry W, Williams D, Merrell RC. Microgravity effects on fine motor skills: tying surgical knots during parabolic flight. *Aviat Space Environ Med*; 77:852–6, 2006.
133. Ramachandran VS. Perceiving Shape from Shading, *Scientific American*, 259(2):76-83, 1988.
134. Raphan T, Matsuo V, Cohen B. Velocity storage in the vestibulo-ocular reflex arc (VOR). *Experimental Brain Research*, 35: p. 229-248, 1979.
135. Reschke MF, Krnavek JM, Somers JT, Ford G. *A brief history of spaceflight with a comprehensive compendium of vestibular and sensorimotor research conducted across the various flight programs*, NASA/ SP-2007-560, 2007.
136. Reschke M, Bloomberg JJ, et al. Visual-vestibular integration as a function of adaptation to spaceflight and return to earth. *Extended Duration Orbiter Medical Project*. C. Sawin, B. C. Taylor and W. L. Smith. Houston, NASA Johnson Space Center: 5.3-41, 1999.
137. Reschke MF, Bloomberg JJ, Harm DL, Paloski WH, Parker DE. *Neurophysiological Aspects: Sensory and Sensory-Motor Function, in Space Physiology and Medicine*, A.E. Nicogossian, Editor. Lea and Febiger, 1994.
138. Reschke MF, Kornilova LN, Harm DL, Bloomberg JJ, Paloski WH. Neurosensory

- and sensory-motor function. In: Leach Huntoon CS, Antipov VV, Grigoriev AL, editors. *Space biology and medicine Volume III: Humans in Spaceflight Book II*; P135-93.1996.
139. Reschke MF, Parker DE. Effects of prolonged weightlessness on self-motion perception and eye movements evoked by roll and pitch. *Aviat. Space. Environ. Med.* 58(9): p. A153-A157, 1987.
 140. Reschke MF, Anderson DJ, Homick JL. Vestibulo-spinal response modification as determined by H-reflex during the spacelab-1 flight. *Exp Brain Res.* 58(9): 64: 358-366, 1986.
 141. Robinson DA. The use of control systems analysis in the neurophysiology of eye movements. *Annual Review of Neuroscience*, 4: p. 463-503, 1981.
 142. Rogers WF. Apollo Experience Report – Lunar Module Landing Gear Subsystem. NASA TND-6850.
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19720018253_1972018253.pdf 1972.
 143. Ross MD, Varelas J. Ribbon synaptic plasticity in gravity sensors of rats flown on neurolab. In: Buckey JC, Homick JL. *The Neurolab Spacelab Mission: Neuroscience Research in Space*. NASA SP-2003-535, 2003.
 144. Ross MD. Changes in rat vestibular system following weightlessness. *J Vestib Res* 3 : 241-251, 1993.
 145. Ross MD. A spaceflight study of synaptic plasticity in adult rat vestibular maculas. *Acta Otolaryngol.* 516 : 1-14, 1994.
 146. Ross MD. Changes in ribbon synapses and rough endoplasmic reticulum of rat utricular hair cells in weightlessness. *Acta Otolaryngol.* 120: 490-499, 2000.
 147. SAE Group-10 Aerospace Behavioral Engineering Technology Committee, Vertical Situation Awareness Subcommittee. Human Interface Criteria for Vertical Situation Awareness Displays, Section 8.3, 3D Nav Displays. Aerospace Recommended Practice (ARP) Document 5430. SAE International, Warrendale PA, 2001.
 148. Sangals J, Heuer H, Manzey D, et al. Changed visuomotor transformations during and after prolonged microgravity. *Exp Brain Res* 129: 378-390, 1999.
 149. Schubert MC, Herdman SJ, et al. Functional measure of gaze stability in patients with vestibular hypofunction. *Ann N Y Acad Sci* 942: 490-1, 2001.
 150. Schubert MC, Herdman SJ, et al. Vertical dynamic visual acuity in normal subjects and patients with vestibular hypofunction. *Otol Neurotol* 23(3): 372-7, 2002.
 151. Shirley RS, Young LR. Motion cues in man-vehicle control. *IEEE Trans Man Machine System* 9(4):121-128, 1968.
 152. Small RL, et al. NSBRI project initiated 9/07; see
<http://www.nsbri.org/Research?Projects/viewdesc.epl?pid=239>, 2007.
 153. Small RL, Keller JW, Wickens CD, Socash C, Ronan AM, Fisher AM.

Multisensory integration for pilot spatial orientation. *Alion Science and Technology MA&D Operation: 151*. Final Report AF03-061 Phase II SIBR Contract FA8650-04-C-6457, 2006.

154. Smith JW, Edwards JW. Design of a nonlinear adaptive filter for suppression of Shuttle Pilot-Induced Oscillation tendencies. *NASA TM81349, NASA DFRC*, 1980.
155. Tafforin C, Thon B, Guell A, Campan R. Astronaut behavior in an orbital flight situation: preliminary ethological observations, *Aviat. Space, Environ. Med.* 60:949–956. 1989.
156. Task HL, Genco, LV. Effects of short-term flight on several visual functions. *Results of the Life Sciences DSOs Conducted Aboard the Space Shuttle 1981-1986*. M. W. Bungo, T. M. Bagian, M. A. Bowman and B. M. Levitan. Houston, NASA: 173 1987.
157. Taube J, Stackman R, Calton J, Oman CM. Rat head direction cell responses in zero-gravity parabolic flight. *J. Neurophysiol.* 92: 2887-2997, 2004.
158. Thornton WE, Biggers WP, et al. Electronystagmography and audio potentials in spaceflight. *Laryngoscope* 95(8): 924-32, 1985.
159. Thornton WE, Moore TP, et al. Studies of the vestibulo-ocular reflex on STS 4, 5, and 6. Houston, NASA, 1988.
160. Thornton WE, Rummel J. *Biomedical Results in Skylab*. NASA. Eds. Johnston RS and Dietien LF. 191-197, 1977.
161. Thornton WE, Uri JJ, et al. Studies of the horizontal vestibulo-ocular reflex in spaceflight. *Arch Otolaryngol Head Neck Surg* 115(8): 943-9, 1989.
162. Tian JR, Jr, Shubayev I, et al. Dynamic visual acuity during passive and self-generated transient head rotation in normal and unilaterally vestibulopathic humans. *Exp Brain Res* 142(4): 486-95, 2002.
163. Tian, JR, Shubayev I, et al. Dynamic visual acuity during transient and sinusoidal yaw rotation in normal and unilaterally vestibulopathic humans. *Exp Brain Res* 137(1): 12-25, 2001.
164. Uri JJ, Linder BJ, Moore TD, et al. Saccadic eye movements during spaceflight. NASA Johnson Space Center, Houston, *NASA TM 100 475*: 1-9, 1989.
165. Vieville T, Clément G, et al. Adaptive modifications of the optokinetic vestibulo-ocular reflexes in microgravity. *Adaptive Processes in Visual and Oculomotor Systems*. E. L. Keller and D. S. Zee. New York, Pergamon Press: 111-120, 1986.
166. von Bech HJA. Experiments with animals and human subjects under sub- and zero-gravity conditions during the dive and parabolic flight. *J. Aviat. Med* 23 1954 235-241
167. Watt DG, Money KE, et al. Canadian medical experiments on Shuttle flight 41-G. *Can Aeron Space J* 31(3): 215-26, 1985.
168. Watt DGD. Pointing at memorized targets during prolonged microgravity. *Aviat Space Environ Med* 68: 99-103, 1997.

169. Wertheim AH, Mesland BS, Bles W. Cognitive suppression of tilt sensations during linear horizontal self-motion in the dark. *Perception* 30: 733-741, 2001.
170. Whiteside TCD. Hand-eye coordination in weightlessness. *Aerospace Med.* 32: 719–725, 1961.
171. Wiegmann D, Faaborg T, Boquet A, Detwiler C, *et al.* Human error and general aviation accidents: A comprehensive fine-grained analysis using HFACS. Washington DC: *Federal Aviation Administration*; 2005, Report No. AM-05/24, 2005.
172. Wiener SI, Taube JS. *Head Direction Cells and the Neural Mechanisms of Spatial Orientation*. Cambridge, MA, MIT Press Bradford Books, 2005.
173. Williamson P. Mobile Servicing System Lessons Learned. MSS Robotics Training Lesson handout; Houston, TX, NASA JSC DX23 ISS Mechanical and Robotic Systems Training: 7 pp. 2007.
174. Wood SJ. Human otolith-ocular reflexes during off-vertical axis rotation: Effect of frequency on tilt-translation ambiguity and motion sickness. *Neurosci Lett* 323: 41-44, 2002
175. Young L. Perception of the body in space: mechanisms, in *Handbook of Physiology - The Nervous System III*, I.D. Smith, Editor. American Physiological Society: Bethesda, MD. p.1023-1066, 1984.
176. Young LR. Human Control Capabilities: Chapter 16 in: *Bioastronautics Data Book*, 2nd Ed. Parker and West, editors. NASA SP-3006, 1973.
177. Young LR. Spatial Orientation. *Principles and Practice of Aviation Psychology*. PS Tsang and Vidulich, MA. Mahwah, N.J., Earlbaum: 69-144, 2003.
178. Young LR, Oman CM. Model for vestibular adaptation to horizontal rotation. *Aerosp Med*, 40(10): p. 1076-80, 1969.
179. Young LR. Some effects of motion cues on manual tracking. *Journal of Spacecraft* 4:1300-1303, 1967.
180. Young LR. *Spatial Orientation*, in *Principles and Practice of Aviation Psychology*, P.S. Tsang and M.A. Vidulich, Editors. Earlbaum: Mahwah, N.J. p. 69-144, 2003.